



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/830,214	04/22/2004	Se-hoon Oh	5649-1275	9024
20792	7590	01/25/2005	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC			GARCIA, JOANNIE A	
PO BOX 37428			ART UNIT	
RALEIGH, NC 27627			PAPER NUMBER	
			2823	

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/830,214	Applicant(s) OH ET AL.	
	Examiner Joannie A Garcia	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 is/are allowed.
- 6) ☒ Claim(s) 1,2,5-14 and 17 is/are rejected.
- 7) ☒ Claim(s) 3,4,15 and 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20040422</u> . | 6) <input type="checkbox"/> Other: ____ |

Art Unit: 2823

Claims 5-17 are objected to because of the following informalities:

In claims 5 and 6, line 3, "crystallizing the HfO₂" should be followed by --dielectric--.

In claim 6, line 4, "N₂, gas" before "or combinations thereof", should be deleted and replaced with --N₂ gas,--.

In claim 7, line 8, "on the HfO₂" should be followed by --dielectric--.

Appropriate correction is required.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 2, 7-10, 13, 14, and 17, are rejected under 35 U.S.C. 102(a) as being anticipated by Iizuka et al (US 2002/0190294 A1).

Iizuka et al discloses forming a lower electrode 105 on a substrate (Figure 13, and Paragraphs 0131 and 0133), wherein the lower electrode is formed of TiN, TaN, WN, Ru, Ir, or Pt (Paragraph 0133), forming an HfO₂ dielectric layer 106 on the lower electrode by an ALD process (Figure 13, and Paragraphs 0131 and 0134), crystallizing the HfO₂ dielectric layer in a low temperature plasma atmosphere at a temperature of 350 °C or 400 °C (Figure 13, and Paragraphs 0131, and 0134), and forming an upper electrode 107 on the HfO₂ dielectric layer (Figure 13, and Paragraphs 0131, and 0135), wherein the upper electrode is formed of TiN, TaN, WN, Ru, Ir, or Pt (Paragraph 0135).

Art Unit: 2823

Claims 5, 6, 11, and 12, are rejected under 35 U.S.C. 103(a) as being unpatentable over Iizuka et al as applied to claims 1, 2, 7-10, 13, 14, and 17, above, and further in view of Harada (US 2001/0195643 A1).

Iizuka et al does not teach annealing the HfO₂ dielectric layer in a plasma atmosphere including N₂. Harada discloses annealing an HfO₂ dielectric layer in a plasma atmosphere including N₂ (Paragraph 0081). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Iizuka et al and Harada to enable the step of forming the HfO₂ dielectric layer 106 of Iizuka et al to be performed, by employing the process disclosed by Harada.

Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 15 and 16 would be allowable if rewritten to overcome the objection(s) set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.


Claim 18 is allowed.

Art Unit: 2823

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joannie García whose telephone number is (571) 272-1861. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



George Fourson
Primary Examiner
Art Unit 2823



JAG

January 21, 2005

GFourson
Primary Examiner